

REVIEW OF THE TORTOISE BEETLE GENERA OF THE TRIBE CASSIDINI OCCURRING IN AMERICA NORTH OF MEXICO (COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE)

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Abstract.—The tribe Cassidini is defined for the Western Hemisphere and the tribe Charidotini is united with it. A key is given for the fifteen genera known to occur in America north of Mexico. Two groups are recognized: the *Cassida* Group with six genera and the *Charidotis* Group with nine genera. *Metrionella* Spaeth, 1932, is recognized in North America for the first time, and a new genus *Opacinota* is proposed for *Coptocycla bisignata* Boheman, 1855. *Metriona* Weise, 1896, and *Nuzonia* Spaeth, 1913, are excluded from the North American fauna. *Metriona turba* Sanderson and King, 1951, is placed in synonymy under *Metrionella bilimeki* (Spaeth, 1932), *Metriona bicolor* (Fabricius) and *M. profligata* (Boheman) are transferred to *Charidotella*, and lectotypes are designated for *M. bilimeki* Spaeth and *Nuzonia ibaguensis* Spaeth, 1912.

The Cassidini is the largest and taxonomically most complex tribe of the chrysomelid subfamily Cassidinae. It is the only currently recognized tribe of Cassidinae with a worldwide distribution, containing 83 valid genera split nearly equally between the Eastern and Western Hemispheres (Seeno and Wilcox, 1982). More than 70% of the valid genus-group names are credited to Franz Spaeth and were published over a 53 year period between 1899 and 1952. Dr. Spaeth, before his death in 1946, is said to have completed a thorough taxonomic treatment of all the Cassidinae genera, but the only completed copy of this work was totally destroyed (Hincks, 1950, 1951). Working with a very incomplete second copy, Hincks (1952) published Spaeth's key to tribes and the last of Spaeth's generic and subgeneric descriptions. He also provided a listing of the world Cassidinae genera, which indicates the conclusions of Spaeth, and reviewed the type-species designations for all genus-group names.

Barber's (1916) synopsis of the North American Cassidinae, although containing much valuable information, is no longer satisfactory for identification purposes due to numerous taxonomic changes and a great quantity of new information. The key to genera given in Arnett (1968) for the United States, as well as those in the faunistic works by Wilcox (1954) and Balsbaugh and Hayes (1972), are no longer adequate considering recent contributions (Riley, 1982, 1985) and the new data presented here. The present work brings together new information in a format which includes diagnoses of the tribe and two generic groupings, a key to the North American genera, and appropriate discussions including distribution and host plant information.

Effort has been made in this work to insure the correct application of generic names to the North American fauna. Type-species for all North American genera have been examined as well as a wide cross section of species from the primarily neotropical

genera. Additionally, representatives of most of the strictly neotropical genera have also been studied. The characters used in the key are combinations of those which define the genera in their entirety as well as those best distinguishing the North American representatives.

TARSAL CLAWS: TERMINOLOGY AND METHODS

The tarsal claws, great in their diversity of structure, are one of the most important diagnostic characters for the genera of the tribe Cassidini, and a clear understanding of the terms and techniques used in their study is necessary.

Tarsal claws which are said to be "appendiculate," or "toothed," possess a broad flange-like basal tooth while claws lacking this structure are termed "simple." Claws of a given claw-pair are "asymmetrical" when one claw is larger or differently shaped than the other, or more commonly, asymmetry is expressed in the development of the basal teeth.

Previous descriptions of asymmetrical claws of cassidine beetles have distinguished between individual claws of a given pair of claws by the terms "inner claw" and "outer claw," but these terms have remained undefined. The terms "anterior claw" and "posterior claw" are proposed as replacements for "outer claw" and "inner claw," respectively. The proposed terminology is much simpler and applies equally to fore, middle, and hind tarsal claws. Anterior and posterior claws are determined by visualizing, or orienting, a specimen into position with legs and tarsi projecting laterad, perpendicular to the longitudinal axis of the body, the claws widely divergent with the apices directed ventrad.

The claws of many species possess small, comb-like structures composed of a series of teeth arranged side by side (Figs. 14, 15). These tooth-combs are referred to as pectines. They vary considerably in size and development, and are clearly homologous with the larger combs of certain cassidine genera which are said to have "pectinate claws." The term "micropecten" was previously used (Riley, 1982, 1985) to describe the smaller, less conspicuous pectines.

When describing the presence or absence of pectines on a single claw or both claws of a given claw-pair, it is necessary to distinguish between the exterior and interior claw surfaces. Returning to the leg positioning mentioned above, those claw surfaces facing away from the beetle's longitudinal axis are the interiors while those facing towards the longitudinal axis are the exteriors. When pectines are said to be symmetrical, they are developed to a more or less equal extent on the anterior and posterior claws with respect to a particular surface. When pectines are asymmetrical, they differ significantly between the anterior and posterior claws with respect to a particular surface. The most commonly encountered asymmetry occurs when pectines are entirely absent from the exterior surface of the anterior claw while they are present and well developed on the other claw surfaces of the given claw-pair. Pectines are symmetrical for both surfaces in Figures 1-3; asymmetrical for exterior surfaces in Figures 5-7; and asymmetrical for both surfaces in Figure 8.

When pectines are small or poorly developed they may not be easily seen under high stereoscopic magnification. In these instances, the tarsus was removed, relaxed in hot 10% KOH, and examined while submersed in alcohol, glycerine or the KOH solution. This allowed rotation of the claws to various angles which exposed the

pectines for viewing along the different claw margins. Mounting claws on microscope slides for examination with a compound microscope is the best technique and the one necessary for detailed examination. To prepare slide mounts, the tarsi or legs were removed from dried specimens, relaxed and lightly cleared for a few minutes in hot 10% KOH. The last tarsal segments were grasped with a fine tipped forceps and crushed just behind the base of the claws which articulate freely in the distal cavities of the segments. If care is exercised, the connecting tissue between the claws will remain intact keeping the claw-pair together in an easily managed condition. Claw-pairs were then transferred to drops of Hoyer's mounting medium on slides and oriented to the desired surfaces. Careful watch was maintained as cover slips were added to insure that the desired perspectives of the claws were retained while the cover slips settled. One fore, one middle, and one hind claw-pair were prepared simultaneously resulting in one slide mount per specimen. The final slides were examined with a compound microscope and the conditions of the claws recorded on code sheets by species and sex. Most slide preparations are maintained in the author's collection as permanent mounts for future reference. Illustrations (Figs. 1-8) were made from slide mounts with the aid of a one hundred unit ocular grid.

Tribe Cassidini

Hybosites Chapuis, 1875:380.
 Cassidites Chapuis, 1875:383.
 Chiridites Chapuis, 1875:405.
 Aspidomorphites Chapuis, 1875:406 (in part).
 Cassiditae Spaeth, 1914:129.
 Coptocyclitae Spaeth and Reitter, 1926:7.
 Charidotitae Spaeth, 1942:40.
 Cassidini Hincks, 1952:330.
 Charidotini Hincks, 1952:330. **New Synonymy.**

Diagnosis. Head horizontal or nearly so; clypeus horizontal; eyes on same level as clypeus or slightly above. Anterior margin of pronotum broadly rounded and concealing head from dorsal view, rarely emarginate (some South American species). Tarsal claws paired, divergent, otherwise highly variable, symmetrical for all tarsi or asymmetrical on middle and hind tarsi; pectines present or absent, when present symmetrical or asymmetrical for either or both surfaces, minute to moderate in size or large and conspicuous, i.e., the tooth-combs of pectinate claws.

Remarks. The above diagnosis defines the Cassidini including the Charidotini in the Western Hemisphere. The genera comprising the Charidotini do not deserve separate tribal status. The enlarged pectines, the primary diagnostic character on which the tribe Charidotini was based, is only the extreme of a range of character states. The configuration of pectines of the genera grouped in this tribe by Hincks (1952) is the same as that found in the genera of the Cassidini that belong to the *Charidotis* Group as defined in this paper. The above diagnosis, if it were applied to the Old World cassidine fauna, would also include the Aspidomorphini.

Somewhat unique to the Cassidini are the instances of asymmetrical claw-pairs. Such asymmetry occurs in the middle and sometimes the hind claws and is expressed

to varying degrees depending on taxon and sex. The Dorynotini and Hemisphaerotini are the only other New World tribes which also have genera with asymmetrical claws. The asymmetry found in these tribes is fundamentally different from that in the Cassidini, occurring consistently in all tarsi of both sexes.

The Cassidini is clearly the most advanced tribe of the subfamily in that they possess a completely horizontal clypeus and concealed head. Although not all the genera have pectens, this is the only tribe (excluding the Old World Aspidomorphini) in which these structures are found. All genera of the Cassidini with enlarged pectens are here recognized in the generic grouping defined as the *Charidotis* Group; nevertheless, it is pecten asymmetry that defines the group, not pecten size (see group diagnosis). The aspidomorphine genera, which also have large pectens, are not closely related to the *Charidotis* Group. They appear to have been derived from the *Cassida* Group since both the Aspidomorphini and the genera of the *Cassida* Group have pectines symmetrical on both surfaces of the claws. Thus, it appears that the enlarged pectines have evolved independently at least twice, once in the Old World aspidomorphines and again in certain genera of the *Charidotis* Group of the New World Cassidini.

KEY TO THE NORTH AMERICAN CASSIDINI GENERA

1. Anterior elytral margins crenulate 2
 - Anterior elytral margins smooth 7
2. Venter of pronotum with short groove on each side of head, each groove bordered externally by short carina 3
 - Venter of pronotum without grooves 4
3. Tarsal claws simple; elytra rugosely punctate or tuberculate *Parorectis*
 - Tarsal claws simple but appearing appendiculate due to the distally projecting flanks of the claw segment (Fig. 13); elytra punctate-striate, smooth *Deloyala*
4. Tarsal claws simple 5
 - Tarsal claws appendiculate 6
5. Apices of elytral epipleura with numerous ventrally projecting setae; elytra with common, post-scutellar protuberance *Coptocycla* (*Psalidonota*)
 - Apices of elytral epipleura essentially glabrous; elytra evenly convex *Cassida* (s. str.) (in part)
6. Antennae long and narrow, 8th segments distinctly longer than wide; elytra tuberculate and with common, post-scutellar protuberance *Plagiometriona* (*Parametriona*)
 - Antennae short and thick, 8th segments as long as wide; elytra punctate-striate, non-tuberculate, evenly convex *Gratiana*
7. Middle and hind tarsal claws distinctly pectinate (easily observed under normal magnification) *Microctenochira* (s. str.)
 - Middle and hind tarsal claws not distinctly pectinate (pectines usually present to some degree but very small) 8
8. All tarsal claws simple 9
 - Claws of fore tarsi appendiculate; middle and hind claws variable, but with at least one claw toothed 12
9. Male with anterior claw of middle tarsus much longer and of different shape than posterior claw; each elytron with three conspicuous maculae *Jonthonota*

- Male with claws of middle tarsus equal or subequal in size and shape; dorsum with vague maculae 10
- 10. Head with fronto-clypeal sulcus absent and base of clypeus poorly defined *Cassida* (s. str.) (in part)
- Head with fronto-clypeal sulcus wide and deep, clearly delineating base of clypeus .. 11
- 11. Elytral margins at apices projecting caudad in a shelf-like fashion, horizontal; epipleura at apices moderately wide, horizontal; elytral margins impunctate *Opacinota*, new genus
- Elytral margins at apices deflexed, not projecting in a shelf-like fashion; epipleura at apices narrower, deflexed; elytral margins distinctly punctate *Floridocassis*
- 12. Male with middle tarsal claws symmetrical possessing equally developed basal teeth; species vittate *Agroiconota*
- Male with middle claws asymmetrical, at least one claw with simple or poorly developed tooth; species non-vittate 13
- 13. Elytral margins at apices projecting caudad in a shelf-like fashion, horizontal; epipleura at apices moderately wide, horizontal; dorsum strongly alutaceous 14
- Elytral margins at apices deflexed, not projecting in a shelf-like fashion; epipleura at apices narrower, deflexed; dorsum usually shining, not strongly alutaceous 15
- 14. Frontal groove crossing septum and continuing on clypeus as distinct median groove; lateral grooves of clypeus more evident; elytral margins impunctate *Strongylocassis*
- Frontal groove crossing septum but not continuing onto clypeus; lateral grooves of clypeus less evident; elytral margins deeply, confusedly punctate *Erepsocassis*
- 15. Clypeus slightly swollen with distinct median groove; lateral grooves distinct and evenly impressed to base of clypeus (Fig. 12) *Metrionella*
- Clypeus flat or depressed in center, without distinct median groove; lateral grooves evident between posterior margin of eyes and bases of mandibles, not evenly impressed to base of clypeus *Charidotella*

Cassida Group

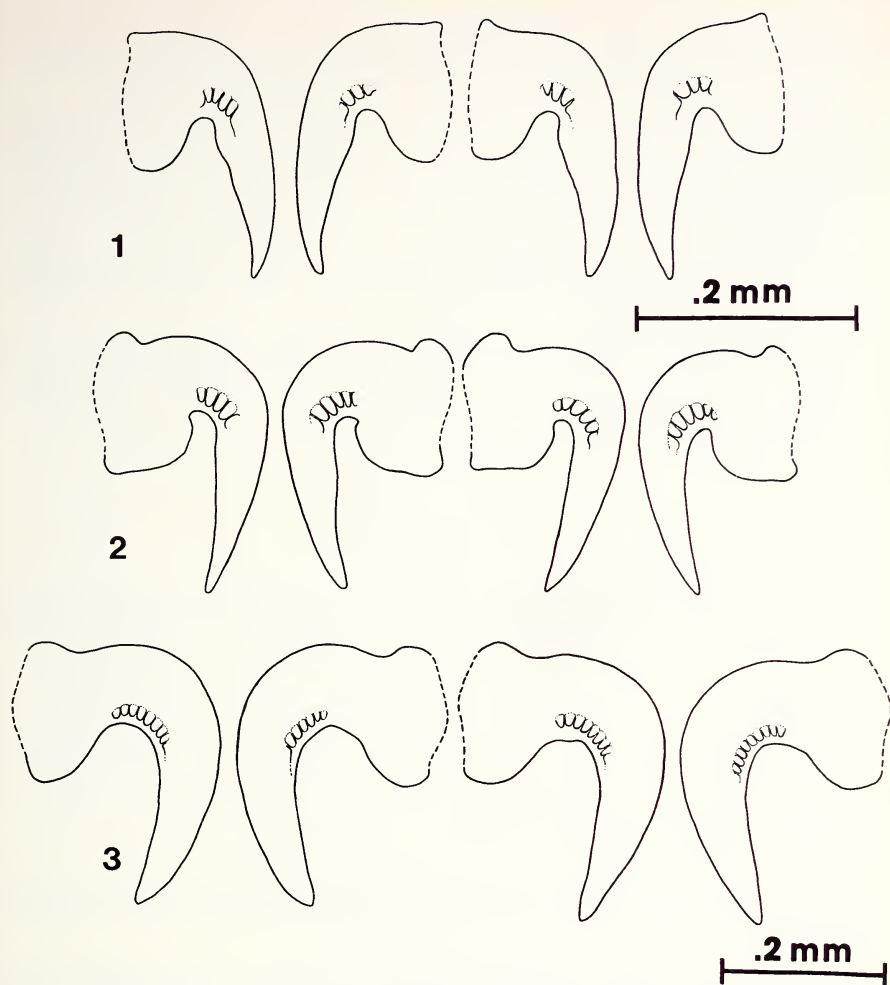
Diagnosis. Anterior elytral margins crenulate to some degree or rarely entirely smooth; all tarsal claws simple or appendiculate, always symmetrical in both sexes; pectens present or absent, when present always symmetrical on both surfaces.

Cassida Linnaeus

Cassida Linnaeus, 1758:362. (See Hincks, 1952, for the extensive synonymy of this primarily Old World genus.)

Three species belonging to the nominate subgenus are known to occur in eastern and central North America. These are the only true *Cassida* species occurring in the Western Hemisphere. *Cassida relict*a Spaeth is native to the nearctic region, *C. rubiginosa* Müller is a known introduction to North America, and *C. flaveola* Thunberg may have been introduced although this has not been documented. Known host plants for the North American species are Compositae and Caryophyllaceae.

The members of this genus have a wide range of variation in the development of the crenulations on the anterior elytral margins. In *C. flaveola* Thunberg the crenulations are greatly reduced or usually entirely absent. The pectens are present on the claws of some species while they are entirely lacking in other species.



Figs. 1-3. Left tarsal claws showing exterior and interior surfaces of anterior claw (on left) and interior and exterior surfaces of posterior claw (on right) of male, middle tarsi of genera belonging to the *Cassida* Group. 1. *Deloyala guttata*. 2. *Plagiometriona (s. str.) vigens*. 3. *Coptocycla (Psalidonota) texana*. Upper scale for Figures 1, 2; lower scale for Figure 3.

Coptocycla Chevrolat

Fig. 3

Coptocycla Chevrolat, 1837:396.

Thyreaspis Hope, 1840:158, 159.

Psalidonota Boheman, 1855:81 (subgenus).

Dyscineta Spaeth, 1936b:252, 260 (subgenus).

Podostraba Spaeth, 1936b:253, 259 (subgenus).

Coptocyclella Hincks, 1952:349 (subgenus).

Coptocycla is one of the three oldest generic names in the tribe Cassidini. As presently defined, it is a moderate sized neotropical genus divided into five subgenera. The single North American species is placed in the subgenus *Psalidonota*.

Originally proposed as a genus, *Psalidonota* was considered a subgenus by Spaeth (1936b) who recognized five species groups and 19 species. It is the best characterized of the five subgenera. Its species form a close assemblage sharing a distinctive habitus. All species are tumid, the elytra having a common post scutellar protuberance; the elytral discs are coarsely punctate, interspersed with impunctate pustulate areas; and the anterior margins of the elytra are deeply, distinctly crenulate. The pectens, which are usually absent or poorly developed in *Coptocycla* (s. str.), are well developed on the species of *Psalidonota*.

Coptocycla (*Psalidonota*) *texana* (Schaeffer) ranges from northeastern Mexico into south Texas (Cameron, Hidalgo, San Patricio and Aransas Counties) and as far north as Comal County, Texas. It feeds on the foliage of "anacua," *Ehretia anacua* (Teran and Berl.) I. M. Johnst., a small tree in the Boraginaceae.

Gratiana Spaeth

Gratiana Spaeth, 1913:142.

One species, *G. pallidula* (Boheman), is generally distributed throughout much of the United States. Known food plants belong to the Solanaceae. This genus is not a synonym of *Nuzonia* (see excluded genera).

Plagiometriona Spaeth

Fig. 2

Plagiometriona Spaeth, 1899:220.

Parametriona Spaeth, 1937:143 (subgenus).

One species, *P. (Parametriona) clavata* (Fabricius) is generally distributed through the east, central and southern United States. Known food plants belong to the Solanaceae.

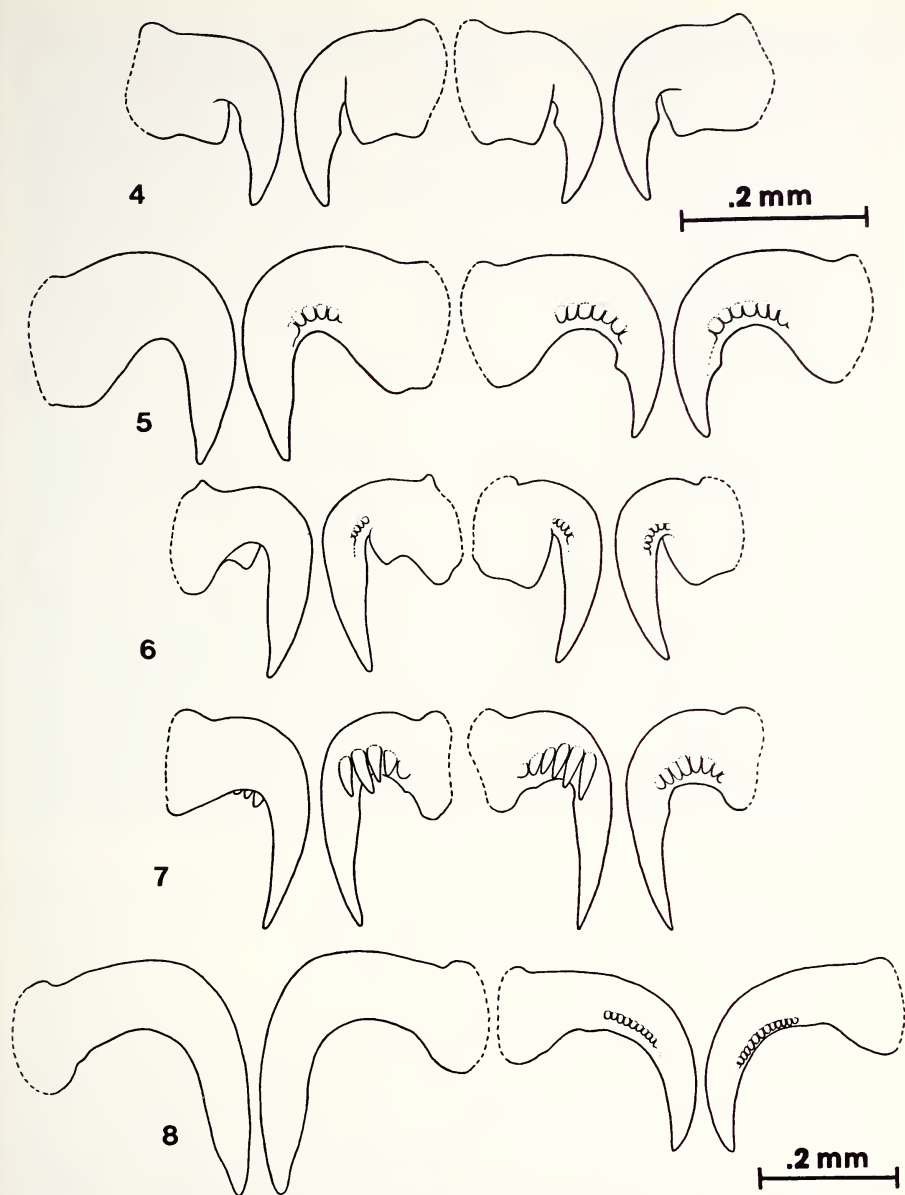
Plagiometriona is a large neotropical genus with about 80 species and is best represented in South America. Spaeth (1937) provided a key to the species groups and described the subgenus *Parametriona* in which he placed *clavata*.

Parorectis Spaeth

Parorectis Spaeth, 1901:346.

Orectis Spaeth, 1901:346 (nec Lederer, 1857).

Two of the three species comprising this genus occur in the southern United States: *P. callosa* (Boheman) is known from South Carolina, Florida, Texas (Barber, 1916), and Alabama (Balsbaugh and Hayes, 1972); *P. subleavis* (Barber), originally described from Texas, also occurs in Arizona (Portal, VIII-6; St. Rita Mts. VII-24), New Mexico (10.7 mi W Hope, VII-30), and Mexico (Sonora, 10 mi SE Agua Prieta, IX-15). Known food plants are Solanaceae.



Figs. 4-8. Left tarsal claws showing exterior and interior surfaces of anterior claw (on left) and interior and exterior surfaces of posterior claw (on right) of male, middle tarsi of genera belonging to the *Cassida* and *Charidotis* Groups. 4. *Agroiconota bivittata*. 5. *Floridocassis repudiata*. 6. *Metrionella bilimeki*. 7. *Microtenochira* (s. str.) *bonovoulori*. 8. *Jonthonota nigripes*. Upper scale for Figures 4-7; lower scale for Figure 8.

Deloyala Chevrolat

Figs. 1, 13

Deloyala Chevrolat, 1837:395.*Chirida* Chapuis, 1875:405.

Four species are generally distributed throughout the United States and southern Canada. Food plants belong to the Convolvulaceae.

Agroiconota Spaeth

Fig. 4

Agroiconota Spaeth, 1913:142.

One species, *A. bivittata* (Say), occurs in the eastern, central and southern United States as well as in Mexico. This genus is included in the *Cassida* group on the basis of its symmetrical tarsal claws which entirely lack pectens (Fig. 4). All species seen thus far (14 in number) have smooth, non-crenulate, anterior elytral margins.

Charidotis Group

Diagnosis. Anterior elytral margins always smooth, never crenulate; tarsal claws simple or appendiculate, symmetrical or middle and sometimes hind tarsal claws asymmetrical to some degree in males and in females of some taxa; pectens present on middle and hind tarsal claws, always asymmetrical on exterior surfaces.

The neotropical genus *Charidotis* Boheman (1855) is the earliest described genus assignable to this group and is the basis for the name.

Jonthonota Spaeth

Fig. 8

Jonthonota Spaeth, 1913:141.

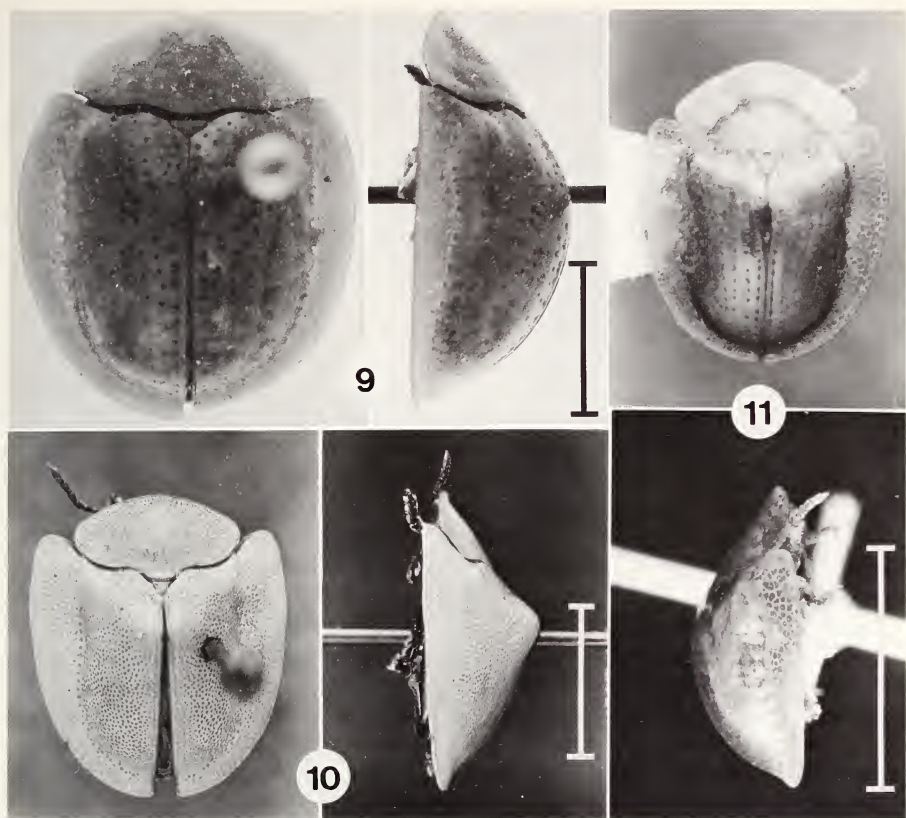
Two species comprise this genus and both occur in the United States: *J. nigripes* (Olivier), transcontinental in distribution, and *J. mexicana* (Champion), found in Arizona, Texas (Davis Mts.), and Mexico. Host plants for *J. nigripes* are members of the Convolvulaceae.

Floridocassis Spaeth

Fig. 5

Floridocassis Spaeth in Hincks, 1952:348.

Floridocassis is monotypic, containing *F. repudiata* (Suffrian), which was originally described from Cuba and subsequently recorded from Florida (Barber, 1916) and Alabama (Balsbaugh and Hayes, 1972). Specimens have been examined from Alabama, Florida, Mississippi (Pearlington, III-19-1968), and South Carolina (Hilton Head Is., VII-2-1965). The distribution of this species is clearly coastal (Fig. 19) and is probably indicative of a close association with a plant species which is closely tied to coastal habitats. Balsbaugh and Hayes (1972) reported collecting *F. repudiata* from Convolvulaceae.



Figs. 9–11. 9. Lectotype, *Nuzonia ibaguensis*. 10. *Metriona elatior*. 11. Lectotype, *Metriponella bilimeki*. Scales = 4 mm.

Opacinota, new genus

Type-species, *Coptocyclus bisignatus* Boheman, 1855. Distribution (Fig. 17).

Continued study of the neotropical genera possessing simple claws has failed to reveal an existing genus suitable for *C. bisignatus*. To accommodate this species, the new genus *Opacinota* (from Latin *opacus*—dim or obscure, and Latin *nota*—mark; gender feminine) is proposed. Illustrations and a description of the important taxonomic characters, as well as the taxonomic history of *C. bisignatus* were given earlier (Riley, 1985), but a new genus was not proposed at that time.

Description. Head with frontal groove extending across septum and terminating in shallow notch on basal margin of clypeus. Fronto-clypeal sulcus wide and deep, nearly horizontal. Basal margin of clypeus raised well above, and projecting slightly over fronto-clypeal sulcus on either side of septum; lateral basal corners obtuse-angulate. Mesial surface of clypeus flat; lateral grooves poorly defined, evident near posterior edge of eyes. Elytra with anterior margins smooth; explanate margins impunctate, moderately to strongly deflexed anteriorly, becoming narrower and more

Table 1. Summary of character states for five monotypic genera of the tribe Cassidini, *Charidotis* Group.

Character ¹	<i>Erepso-</i> <i>cassis</i>	<i>Florido-</i> <i>cassis</i>	<i>Mexi-</i> <i>caspis</i> ²	<i>Opacinota</i>	<i>Strongylo-</i> <i>cassis</i>
Some tarsal claws toothed (all claws simple)	+	—	+	—	+
Elytral margins punctate (impunctate)	+	+	—	—	—
Elytral epipleura at apices moderately wide, horizontal (narrower, deflexed)	+	—	—	+	+
Pronotal corners angulate in male (rounded)	—	+	+	—	+
Clypeus with median groove (without groove)	—	—	—	—	+

¹ Positive character states presented first followed by the negative condition in parentheses.² A Mexican genus.

horizontal posteriorly until apices where they project caudad in a shelf-like fashion. Epipleura at apices moderate in width, horizontal and glabrous; anterior inner edge entire, not modified to engage with metepisternum. All claws of both sexes simple; male with anterior claw of middle tarsi slightly larger than posterior claw; pectines absent (usually) or very poorly formed on internal surfaces of front tarsal claws, absent from external surfaces of anterior claws of middle and hind tarsi, present and well developed on other surfaces of middle and hind claws. Internal sac of aedeagus without sclerotized process.

This is the fifth genus of a group of monotypic genera whose species are strikingly similar in general appearance. The character states separating the five genera are summarized in Table 1. Host plants of *O. bisignata* are members of the Convolvulaceae.

Strongylocassis Hincks

Stronglyaspis Spaeth, 1936a:216, 259 (nec Thomson, 1860).

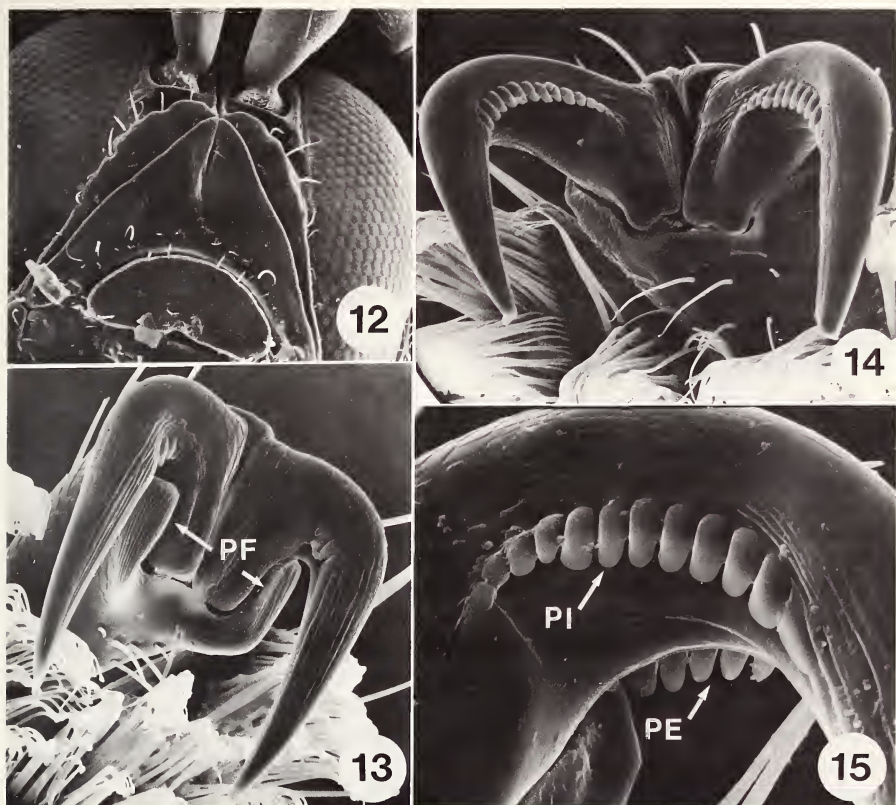
Strongylocassis Hincks, 1950:511 (new name for *Stronglyaspis* Spaeth, 1936).

Strongylocassis is monotypic containing *S. atripes* (LeConte) which is found throughout most of the central and eastern United States north to southeastern Canada. Known food plants are members of the Convolvulaceae. The taxonomy of this genus and species was reviewed earlier (Riley, 1985).

Erepsocassis Spaeth

Erepsocassis Spaeth, 1936a:260.

Erepsocassis is monotypic containing *E. rubella* (Boheman) which is known from several southeastern states (Fig. 6). Host plants have not been reported for this species. The taxonomy of this genus and species was reviewed earlier (Riley, 1982).



Figs. 12–15. 12. SEM of clypeus of *Metrionella bilimeki*. 13. Male, middle tarsal claws of *Deloyala guttata*. 14. Male, middle tarsal claws of *Charidotis* sp. 15. Posterior claw of male, middle tarsus of *Charidotis* sp. PF = projecting flanks, PI = pecten of interior claw surface, PE = pecten of exterior claw surface.

Metrionella Spaeth

Figs. 6, 11, 12

Metrionella Spaeth, 1932:263.

Metrionella bilimeki (Spaeth) is primarily a Mexican and Central American species which ranges north into southeastern Arizona and is the only species of *Metrionella* that occurs in America north of Mexico (Fig. 18).

Originally proposed as a subgenus of *Metriona* Weise, 1896, *Metrionella* was later listed as a full genus by Spaeth (*in* Hincks, 1952). It has not been previously reported from north of Mexico since *M. bilimeki* has been known by the name *Metriona turba* Sanderson and King, 1951. The holotype, allotype and two paratypes of *M. turba* [SEMC], and the syntypes of *M. bilimeki* [Spaeth Coll., Manchester Museum] have been examined and it is clear that the two names are synonyms, NEW SYNONYMY. Since Spaeth failed to indicate a holotype, a male (Fig. 11) labeled “Guatemala”

"*Bilimeki* m. Typus Spaeth det." "Typus" is here designated as lectotype and so labeled. The remaining 15 syntypes are designated as paralectotypes and appropriately labeled.

Food plants have not been reported for *M. bilimeki*; however, the writer has taken this species and the type-species of the genus, *Metrionella erratica* (Boheman), on unidentified Convolvulaceae in Mexico.

Charidotella Weise

Charidotella Weise, 1896:13.

Philaspis Spaeth, 1913:142 (subgenus).

Xenocassis Spaeth, 1936a:260 (subgenus).

Chaerocassis Spaeth in Hincks, 1952:350 (subgenus).

Charidotella was originally proposed as a subgenus of *Metriona* and was based on *Cassida zona* Fabricius, the only originally included species. *Metriona* was proposed in the same paper and, as defined, included nearly all the Cassidini with toothed tarsal claws and hence was a highly artificial assemblage of both New and Old World species. Spaeth (1914) designated *Cassida elatior* Klug as type-species for *Metriona*. This species was originally included and is an excellent example of toothed tarsal claws, the character state originally prescribed for the genus. It is, however, an unusual species possessing a unique combination of features. Considering the contents of "*Metriona*" at the time of Spaeth's 1914 catalog, it was a poor choice for type-species. Spaeth never formally defined *Metriona* nor *Charidotella*, but in an annotated list of Peruvian Cassidinae (1942) he recognized the latter as a full genus with several species listed under it including the common "*Metriona*" *sempunctata* (Fabricius).

From study of the included species, *Charidotella* is undoubtedly the correct genus for most of the species still cataloged in *Metriona*. It is one of the largest genera of the *Charidotis* Group. Seven species occur in America north of Mexico: *C. emarginata* (Boh.), *C. ormondensis* (Blatchley), *C. purpurata* (Boh.) (these three transferred from *Metriona* to *Charidotella* (*Chaerocassis*) by Hincks (1952, p. 350)), *C. bicolor* (F.), *C. profligata* (Boh.) (here transferred from *Metriona*, NEW COMBINATIONS), and two neotropical species not previously recorded from America north of Mexico. In North America the genus is distributed in southern Canada and throughout the United States. Taxonomy of the North American species and the subgenera listed above are currently under study by the author. Host plants are members of the Convolvulaceae.

Microctenochira Spaeth

Fig. 7

Ctenochira Chapuis, 1875:409 (nec Foerster, 1855).

Microctenochira Spaeth, 1926:36, 104.

Euctenochira Hincks, 1950:509 (new name for *Ctenochira* Chapuis) (subgenus).

Microctenochira (s. str.) *bonvouloiri* (Boheman) occurs from south Texas to Costa Rica and is the only representative of this large neotropical genus that ranges into the United States. It has been collected from *Merrimia dissecta* (Jacq.) Hallier f.



Figs. 16–19. Distributions of North American Cassidini species based on specimens examined by author. 16. *Erepsocassis rubella*. 17. *Opacincta bisignata*. 18. *Metrionella bilimeki*. 19. *Floridocassis repudiata*. N = national record.

(Convolvulaceae) in the area about Brownsville, Texas, and from unidentified Convolvulaceae in Mexico.

GENERA EXCLUDED FROM NORTH AMERICA

Metriona Weise
Fig. 10

Metriona Weise, 1896:13, 14.

In its strict sense, this genus belongs to the *Cassida* Group and is closely related to *Plagiometriona*. It occurs only in South America. The bulk of the species catalogued in *Metriona* belong to *Charidotella* (see discussion under *Charidotella*). Photographs of the type-species, *Cassida elatior* Klug, are provided (Fig. 10).

Nuzonia Spaeth

Fig. 9

Nuzonia Spaeth, 1912:5.

Litocassis Weise, 1921:197.

This generic name entered the North American literature through Blackwelder (1946) who listed *Gratiana* as a junior synonym. The reason behind this synonymy is unknown to the present writer. The apparent synonymy in Blackwelder's catalog was followed in two popular identification manuals (Wilcox, 1954, and Balsbaugh and Hays, 1972) and, excepting Arnett (1968), has been generally adopted. Study of the original descriptions and several representatives of *Gratiana* and *Nuzonia* has shown that both are separate valid genera belonging to the *Cassida* Group. *Gratiana*, whose members are small, pale green, and depressed in body form, has toothed tarsal claws, while *Nuzonia*, whose members closely resemble those of *Coptocycla* (s. str.), has simple claws. Species of *Nuzonia* occur in Central and South America.

During the course of investigating this confusion, a syntype [Spaeth Coll., Manchester Museum] of *Nuzonia ibaguensis* Spaeth, type-species of *Nuzonia*, was examined. The specimen (Fig. 9), a male, labeled "Colombie Ibaque Fr. Claver" "Nuzonia ibaguensis type Spaeth det." "Typus" is here designated as lectotype. A second syntype, a female labeled "Columbia Pehlke," originally deposited in the Stettin Museum and now housed in the Department of Zoology, Agricultural Academy, Wrocław, Poland, is here designated as a paralectotype.

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